

IN THE CLAIMS

What is claimed is:

1 **1.** A method of forming a plurality of semiconductor device layers, comprising the
2 steps of:

3 forming an oxide layer by reacting hydrogen and oxygen on a surface
4 of an insulating layer deposited over a wafer; and
5 forming a conductive gate layer over the oxide layer.

1 **2.** The method of claim 1, wherein:

2 the reacting of hydrogen and oxygen is performed at a wafer
3 temperature in the range of about 800°C to 1300°C.

1 **3.** The method of claim 1, wherein:

2 the oxide layer has a thickness in the range of 20-60 angstroms.

1 **4.** The method of claim 1, wherein:

2 the reacting of hydrogen and oxygen on the wafer surface has a
3 duration in the range of 30 seconds to 2 minutes.

1 **5.** The method of claim 4, wherein:

2 the reacting of hydrogen and oxygen on the wafer surface has a
3 duration in the range of approximately 1 minute.

- 1 **6.** The method of claim 1, wherein:
2 the conductive gate material includes polysilicon.

- 1 **7.** The method of claim 1 wherein:
2 the oxide layer and conductive gate layer form a SONOS-type device.

- 1 **8.** The method of claim 1 wherein steps prior to forming the oxide layer comprise:
2 forming a tunnel dielectric; and
3 depositing the insulating layer, the insulating layer being a charge
4 storing dielectric layer.

- 1 **9.** The method of claim 8 wherein:
2 the charge storing dielectric layer includes silicon nitride.

- 1 **10.** The method of claim 1, further including:
2 forming a gate etch mask; and
3 etching to form gate stacks; and
4 forming insulating sidewalls on the gate stacks.

- 1 **11.** The method of claim 8, wherein:
2 forming the tunnel dielectric, forming the charge storing dielectric
3 layer, and forming the oxide layer occur in a single wafer processing tool.

1 **13.** The method of claim 12, wherein:

2 forming the top dielectric further includes reacting the surface of the

3 middle dielectric layer with hydrogen and oxygen.

1 **14.** The method of claim 12 wherein:

2 the middle dielectric comprises at least one layer selected from the

3 group consisting of silicon nitride, silicon oxynitride, and silicon rich silicon

4 nitride.

1 **15.** The method of claim 12 wherein:

2 the bottom dielectric has a thickness of less than 15 angstroms; and

3 the top dielectric has a thickness of less than 50 angstroms.

1 **16.** A method of manufacturing a SONOS-type device, comprising the steps of:
 2 oxidizing a charge storing dielectric comprising at least one layer that
 3 includes silicon and nitrogen by reacting hydrogen and oxygen to form a top
 4 oxide layer over the charge storing dielectric.

1 **17.** The method of claim 16, wherein:
 2 the oxidizing lasts for less than two minutes.

1 **18.** The method of claim 16, wherein:
 2 the oxidizing occurs at a temperature of less than 1200 °C.

1 **19.** The method of claim 16, further including:
 2 a tunnel dielectric formed below the charge storing dielectric;
 3 forming a conductive gate layer over the top oxide layer; and
 4 patterning at least the top oxide and charge storing dielectric to form a
 5 gate stack.

1 **20.** The method of claim 16, wherein:
 2 the top dielectric has a thickness greater than 20 angstroms.